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TITLE: INSECT RESISTANT PLANTS

APPLICANT: ADAMS, MICHAEL J. ; KEMP, JOHN D.

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ASSIGNOR: ADAMS, MICHAEL J.

EXC DATE: 10/24/88

ASSIGNEE: LUBRIZOL GENETICS, INC., 29400 LAKE LAND BLVD., WICKLIFFE, OH  
44092, A CORP. OF NV

BRIEF:

ASSIGNMENT OF ASSIGNORS INTEREST  
RETURN ADDRESS: ELLEN P. WINNER

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5370 MANHATTAN CIRCLE, STE. 201  
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REEL: 4986 FRAME: 0932 DATE RECORDED: 12/19/88 NUMBER OF PAGES: 002

ASSIGNOR: KEMP, JOHN D.

EXC DATE: 11/09/88

ASSIGNEE: LUBRIZOL GENETICS, INC., 29400 LAKE LAND BLVD., WICKLIFFE, OH  
44092, A CORP. OF NV

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RETURN ADDRESS: ELLEN P. WINNER

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NO MORE INFORMATION FOR THIS SERIAL NUMBER

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FILE: 4986 FRAME: 0932 MAILROOM DT: 12/19/88 NEW APP FIL RCPT DT: 00/00/00  
CONTROL NO: DT: 00/00/00 REC KEY DATE: 00/00/00 DT MAILED: 00/00/00  
DATE RECORDED: 12/19/88 NUMBER OF PAGES: 002

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BRIEF:

ASSIGNMENT OF ASSIGNORS INTEREST.

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\*WARNING\* - FIELD CODE NOT VALID 'CLMS'

6215 BACILLUS

361 THURINGIENSIS

319 BACILLUS THURINGIENSIS

(BACILLUS(W)THURINGIENSIS)

0 PLANT#/CLMS

L1 0 BACILLUS THURINGIENSIS AND PLANT#/CLMS

=> s bacillus thuringiensis

6215 BACILLUS

361 THURINGIENSIS

L2 319 BACILLUS THURINGIENSIS

(BACILLUS(W)THURINGIENSIS)

=> s 12 and plant#/clm

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U.S. Patent & Trademark Office

P0003

16278 PLANT#/CLM

L3 106 L2 AND PLANT#/CLM

=> s 13 and 435/clas

23532 435/CLAS

L4 31 L3 AND 435/CLAS

=> d 1-31

1. 5,126,133, Jun. 30, 1992, *Bacillus thuringiensis* isolate active against lepidopteran pests, and genes encoding novel lepidopteran-active toxins; Jewel Payne, et al., 424/93L, 93A; 435/69.1, 71.2, 91, 170, 172.1, 172.3, 252.3, 252.5, 320.1, 832; 536/27; 935/6, 9, 22, 59, 60, 61, 64 [IMAGE AVAILABLE]

2. 5,120,536, Jun. 9, 1992, *Bacillus thuringiensis* var. *donegani* prepate or toxin obtained from it, endowed with insecticide activity against Coleoptera; Dante Cidaria, et al., 424/93L; 435/252.1, 252.3, 252.5, 832; 530/350 [IMAGE AVAILABLE]

3. 5,093,120, Mar. 3, 1992, Novel isolates of *Bacillus thuringiensis* having activity against nematodes; David L. Edwards, et al., 424/93L; 435/172.3, 252.5, 317.1, 832; 514/2; 800/205; 935/63, 64 [IMAGE AVAILABLE]

4. 5,087,558, Feb. 11, 1992, Method for identifying and characterizing organisms; John A. Webster, Jr., 435/5, 4, 6, 34, 810; 436/804; 536/27; 935/78 [IMAGE AVAILABLE]

5. 5,055,588, Feb. 4, 1992, Bacterial promoters inducible by plant extracts; Sharon R. Long, et al., 435/69.1, 71.2, 172.3, 252.2, 12:37:18 COPY AND CLEAR PAGE, PLEASE

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U.S. Patent & Trademark Office

P0004

252.3, 320.1, 878; 536/27; 800/205; 935/35, 36, 41, 43, 67, 72

[IMAGE AVAILABLE]

6. 5,163,055, Nov. 5, 1991, Preparation of strains of *Bacillus thuringiensis* having an improved activity against certain lepidopterous pests and novel strain produced thereby; Denis H. Burges, et al., 424/93R; 435/69.1, 71.1, 172.1, 172.3, 252.5, 320.1, 832; 536/27; 935/55, 59, 64, 66, 74 [IMAGE AVAILABLE]

7. 5,061,489, Oct. 29, 1991, Insecticidal *Bacillus thuringiensis*

strains with activity against lepidoptera; Roger L. Bernier, et al.,  
424/93L; 435/71.2, 252.5, 832 [IMAGE AVAILABLE]

8. 5,045,460, Sep. 3, 1991, DNA sequence encoding  
metallocarboxypeptidase inhibitor protein; Belinda M. Martineau, et al.,  
435/172.3, 317.1; 536/27; 935/30, 67 [IMAGE AVAILABLE]

9. 5,037,523, Aug. 13, 1991, Novel *Bacillus thuringiensis* isolate  
denoted B.t. PS81F, active against lepidopteran pests, and a gene  
encoding a lepidopteran-active toxin; Jewel Payne, et al., 424/93L;  
435/69.1, 71.1, 71.3, 91, 170, 172.1, 172.3, 240.1,  
252.3, 320.1, 832, 848, 874; 536/27; 935/6, 9, 22, 59, 66, 72,  
73 [IMAGE AVAILABLE]

10. 5,017,373, May 21, 1991, Cloning and expression of *Bacillus*  
*thuringiensis* gene toxic to beetles of the order coleoptera; Corinna  
Herrnstadt, et al., 424/93A; 435/69.1, 71.2, 91, 170, 172.1,  
172.3, 252.34, 320.1, 876; 536/27; 935/6, 9, 22, 29, 59, 60, 64,  
66, 72 [IMAGE AVAILABLE]

11. 5,015,580, May 14, 1991, Particle-mediated transformation of soybean  
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05 AUG 92 12:38:26 U.S. Patent & Trademark Office P0005  
plants and lines; Paul Christou, et al., 435/172.3, 172.1, 240.45,  
240.47, 240.48, 240.5, 317.1, 320.1; 800/205, DIG.26; 935/30,  
52, 53, 67, 85 [IMAGE AVAILABLE]

12. 5,008,194, Apr. 16, 1991, *nifH* promoters of *Bradyrhizobium*; Barry G.  
Rolfe, et al., 435/172.3, 252.2, 252.3, 320.1; 536/27; 935/6, 35,  
41 [IMAGE AVAILABLE]

13. 5,006,336, Apr. 9, 1991, Novel coleopteran-active *Bacillus*  
*thuringiensis* isolate; Jewel Payne, 424/93L; 435/252.5, 822;  
530/350 [IMAGE AVAILABLE]

14. 5,004,863, Apr. 2, 1991, Genetic engineering of cotton plants and  
lines; Paul F. Umbeck, 800/205; 435/172.3; 800/200, 255, DIG.27,  
DIG.63; 935/67 [IMAGE AVAILABLE]

15. 5,002,765, Mar. 26, 1991, Cloning and expression of *Bacillus*  
*thuringiensis* gene toxic to beetles of the order coleoptera; Corinna  
Herrnstadt, et al., 424/93A; 435/69.1, 71.2, 91, 170, 172.1,  
172.3, 252.3, 252.33, 252.34; 536/27; 935/6, 9, 22, 29, 59, 60,  
61, 66, 72, 73 [IMAGE AVAILABLE]

16. 5,001,061, Mar. 19, 1991, *nifD* promoter of *Bradyrhizobium*; Barry G.  
Rolfe, et al., 435/172.3, 252.2, 252.3, 320.1; 536/27; 935/6, 35,  
41 [IMAGE AVAILABLE]

17. 4,999,192, Mar. 12, 1991, Novel coleopteran-active *Bacillus*  
*thuringiensis* isolate; Jewel Payne, et al., 424/93L, 195.1, DIG.8;  
435/252.5, 832; 530/350 [IMAGE AVAILABLE]

18. 4,990,332, Feb. 5, 1991, Novel lepidopteran-active *Bacillus*  
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05 AUG 92 12:39:41 U.S. Patent & Trademark Office P0006

thuringiensis isolate; Jewel Payne, et al., 424/93L, 84; 435/252.5  
[IMAGE AVAILABLE]

19. 4,966,765, Oct. 30, 1990, Novel coleopteran-active Bacillus thuringiensis isolate; Jewel Payne, et al., 424/93L; 435/252.1, 252.5, 832; 530/350, 825 [IMAGE AVAILABLE]

20. 4,910,016, Mar. 20, 1990, Novel Bacillus thuringiensis isolate; Frank H. Baertner, et al., 424/93L, 195.1, DIG.8; 435/252.5, 832

21. 4,902,507, Feb. 20, 1990, Toxic strains of the bacterium Bacillus thuringiensis for control of the bertha armyworm Mamestra configurata; Oswald N. Morris, et al., 424/93L, 88, 92; 435/252.31

22. 4,889,918, Dec. 26, 1989, Protein toxin from bacillus thuringiensis which is toxic to coleoptera; Aloisius Krieg, et al., 530/350; 424/405; 435/69.1, 71.3, 832; 514/2

23. 4,853,332, Aug. 1, 1989, Structural genes, plasmids and transformed cells for producing cysteine depleted muteins of biologically active proteins; David F. Mark, et al., 435/252.33, 69.52, 172.3, 252.1, 320.1; 536/27; 930/141, 142

24. 4,803,165, Feb. 7, 1989, Nif promoter of fast-growing rhizobium japonicum; Edward R. Appelbaum, 435/172.3, 69.1, 252.2, 252.33, 320.1; 536/27; 935/29, 30, 41, 56, 64, 67, 72

25. 4,797,276, Jan. 10, 1989, Cotton boll weevil, alfalfa weevil, and corn rootworm via contact with a strain of bacillus thuringiensis; Corinna Herrnstadt, et al., 424/84, 93L; 435/71.3, 832

12:39:43 COPY AND CLEAR PAGE, PLEASE

05 AUG 92 12:40:05 U.S. Patent & Trademark Office P0007

26. 4,771,002, Sep. 13, 1988, Transcription in plants and bacteria; Stanton B. Gelvin, 435/172.3, 252.2, 252.33, 320.1; 935/30, 35, 56, 72

27. 4,766,203, Aug. 23, 1988, New strain of Bacillus, a toxin derived thereof and a composition for combating Coleoptera; Aloisius Krieg, et al., 530/370; 424/93L; 435/832; 514/2; 530/825

28. 4,754,372, Aug. 16, 1988, Compositions containing bacillus thuringiensis toxin toxic to beetles of the order coleoptera, and uses thereof; Corinna Herrnstadt, et al., 424/93L, 84; 435/832; 514/2

29. 4,737,462, Apr. 12, 1988, Structural genes, plasmids and transformed cells for producing cysteine depleted muteins of interferon-.beta.; David F. Mark, et al., 435/252.33, 240.1, 240.2, 240.4, 243, 252.31, 252.34, 320.1; 536/27; 930/142, DIG.530

30. 4,717,653, Jan. 5, 1988, Method for identifying and characterizing organisms; John A. Webster, Jr., 435/5, 6, 35, 39, 172.3, 803; 436/501; 935/78 [IMAGE AVAILABLE]

31. 4,695,485, Sep. 22, 1987, Cellular encapsulation of pesticides produced by expression of heterologous genes; Andrew C. Barnes, et al.,

424/930; 47/58; 435/69.1, 172.3, 252.3, 252.31, 252.33,  
252.34, 254, 255, 256, 260, 317.1  
=> c 14 ad

US PAT NO: 5,004,863 [IMAGE AVAILABLE] L4: 14 of 31  
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05 AUG 92 12:40:54 U.S. Patent & Trademark Office P0008

US PAT NO: 5,004,863 [IMAGE AVAILABLE] L4: 14 of 31

ABSTRACT:

A method is disclosed to achieve genetic transformation of cotton plants and lines. Immature cotton tissues are genetically transformed in vitro, by Agrobacterium-mediated genetic transformation. The resultant cotton tissues are subjected to a selection agent or agents to screen for transformants. The transformed cultures are then induced to commence somatic embryogenesis. One possible regime for regenerating such somatic embryos into whole cotton plants is disclosed.

=> d his

(FILE 'USPAT' ENTERED AT 12:33:42 ON 05 AUG 92)

L1 0 S BACILLUS THURINGIENSIS AND PLANT#/CLMS  
L2 319 S BACILLUS THURINGIENSIS  
L3 106 S L2 AND PLANT#/CLM  
L4 31 S L3 AND 435/CLAS

=> s 12 and (transform? or transgenic)(w)plant#

126336 TRANSFORM?

57 TRANSGENIC

100903 PLANT#

76 (TRANSFORM? OR TRANSGENIC)(W)PLANT#

L5 4 L2 AND (TRANSFORM? OR TRANSGENIC)(W)PLANT#

=> d 1-4

1. 5,045,460, Sep. 3, 1991, DNA sequence encoding  
metallocarboxypeptidase inhibitor protein; Belinda M. Martineau, et al.,  
12:42:58 COPY AND CLEAR PAGE, PLEASE  
05 AUG 92 12:43:01 U.S. Patent & Trademark Office P0009  
435/172.3, 317.1; 536/27; 935/30, 67 [IMAGE AVAILABLE]

2. 5,015,580, May 14, 1991, Particle-mediated transformation of soybean  
plants and lines; Paul Christou, et al., 435/172.3, 172.1, 240.45,  
240.47, 240.48, 240.5, 317.1, 320.1; 800/205, DIG.26; 935/30, 52, 53, 67,  
85 [IMAGE AVAILABLE]

3. 5,004,863, Apr. 2, 1991, Genetic engineering of cotton plants and  
lines; Paul F. Umbeck, 800/205; 435/172.3; 800/200, 255, DIG.27, DIG.63;  
935/67 [IMAGE AVAILABLE]

4. 4,771,002, Sep. 13, 1988, Transcription in plants and bacteria;  
Stanton B. Geivin, 435/172.3, 252.2, 252.33, 320.1; 935/30, 35, 56, 72  
=> set high off

SET COMMAND COMPLETED

=> s (transgenic or transform?)(w)plant#

57 TRANSGENIC

126336 TRANSFORM?

100903 PLANT#

L6 76 (TRANSGENIC OR TRANSFORM?)(W)PLANT#

=> set high on  
SET COMMAND COMPLETED

=> s 12 and 16

L7 4 L2 AND L6

=> d kwic

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U.S. Patent & Trademark Office

P0010

US PAT NO: 5,045,460 [IMAGE AVAILABLE]

L7: 1 of 4

DETD(5)

DETD(5)

MCPI . . . amino peptidase inhibitors, and carboxypeptidase inhibitors having different specificity than the MCPI proteinase. Toxins, such as the crystal protein of *Bacillus thuringiensis* (Bt) have been expressed in plants and have shown insecticidal activity (See, European Patent Application 0193259).

=> d 2-4 kwic

US PAT NO: 5,015,580 [IMAGE AVAILABLE]

L7: 2 of 4

DETD(5)

DETD(42)

The . . . the alfalfa mosaic virus (AMV) coat protein mRNA 5' untranslated region, a DNA fragment encoding an amino-terminal portion of the *Bacillus thuringiensis* delta-endotoxin, and a fragment encoding the polyadenylation region of the nopaline synthase gene from *Agrobacterium tumefaciens* strain A208.

US PAT NO: 5,004,863 [IMAGE AVAILABLE]

L7: 3 of 4

DETD(5)

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U.S. Patent & Trademark Office

P0011

US PAT NO: 5,004,863 [IMAGE AVAILABLE]

L7: 3 of 4

DETD(4)

The . . . be any foreign gene selected to achieve a useful result if expressed in cotton plants. For example, expression of the *Bacillus thuringiensis* crystal protein toxin in the cells of cotton plants would make those cells toxic if ingested by *Lepidoptera* insects, thus. . .

US PAT NO: 4,771,002

L7: 4 of 4

SUMMARY:

BSUM(53)

The . . . anaerobic conditions (e.g. water-logging), drought, or osmotic stress; improved resistance or tolerance to insect (e.g.

insecticidal toxins such as the *Bacillus thuringiensis* crystal  
protein; arachnid, nematode, or epiphyte pests and fungal, bacterial, or  
viral diseases; the production of enzymes or secondary metabolites.

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U.S. Patent & Trademark Office LOGOFF AT 12:45:53 ON 05 AUG 92

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